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STATE OF NEW YORK
HUGH L. CAREY, Governor

DEPARTMENT OF TRANSPORTATION
WILLIAM C. HENNESSY, Commissioner

1220 WASHINGTON AVE., STATE CAMPUS, ALBANY, NEW YORK 12232

MONOLITHIC BRIDGE DECK EXPERIMENTAL COST EFFECTIVE RESTORATION SOUTHWESTERN BLVD. S.H. 9269 (ROUTE 20) OVER 18 MILE CREEK

materials bureau technical services subdivision

INITIAL REPORT

78-1

EXPERIMENTAL FEATURE PROJECT NO. 013676006
MONOLITHIC BRIDGE DECK
EXPERIMENTAL COST EFFECTIVE RESTORATION
SOUTHWESTERN BLVD. S.H. 9269 (ROUTE 20)
INITIAL REPORT
JANUARY 1978

RONALD A. BROWN

SOUTHWESTERN BLVD. S.H. 9269 (RTE. 20)
BIN 1015450, ERIE COUNTY
CONTRACT RC 66-21, PIN 5034.37

The structure carrying Southwestern Blvd. over 18 mile Creek consists of seven simple spans with a total length of approximately 414 feet and width of 40 feet. Built in 1930, it was reconstructed in 1968 and has an 11" monolithic deck. The new rehabilitation done in 1976-77 consisted of various items of concrete removal followed by an overlay of Latex Modified Concrete. The areas of the various concrete removal items were based on a survey conducted on April 6, 1976, which consisted of visual inspection, chain drag, pachometer readings, and half cell potential readings. The overlay placement was performed on the WB lanes September 25, 1976, October 15, 1976, and the EB lanes November 17, 1976, April 29, 1977. The overlay was designed to provide at least 2¼" of cover over the rebars. The minimum thickness was 1½" and in many areas 3" or more in depth.

On May 19, 1977, the Latex Modified Concrete overlay was inspected and a corrosion potential survey was conducted. (see Table #1) Wires connected to the rebars in each span were used for grounds. The following observations concerning the overlay were made:

1. The entire bridge deck was visually inspected and no distress or cracked areas were noted.

2. The tine texture appeared marginal to adequate in most areas though there were a few "open" or torn areas.

3. Results of the potential survey show values decreasing in all areas (see Table #1), although some readings indicate an "active" condition. (greater than 0.35)

On November 16, 1977, the new overlay again was visually inspected and the following observations were noted:

1. All longitudinal joints between lanes have separated. The separation is very slight.

2. Small transverse cracks appeared at the longitudinal joints in the outside lanes and extend towards the curb. They are spaced every 1-1½ feet apart and are about 6 inches long.

3. A few longitudinal cracks have developed from some transverse joints. The cracks are approximately 1½ feet in length.

4. A number of large longitudinal and transverse cracks have developed in middle of some spans.

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5. A small patch in Span 1 has delaminated and cracked.

6. Many transverse joints contain "hollow" areas on each side of joint (see Fig. 1)

A detailed map showing the location of cracks and delaminated areas will be forwarded in the future. Electrical potentials will be taken to monitor the performance of the overlay system.

SOUTHWESTERN BLVD. S.H. 9269 (ROUTE 20)
STRUCTURAL CORES

CORE #	SPAN #	GRID LOCATION LONGITUDINAL	GRID LOCATION TRANSVERSE	CORE DEPTH	POTENTIAL	REBAR COVER PACH.MEAS.	REBAR COVER ACTUAL	REMARKS
1	1	20' North of Approach Slab	20'	Bottom Steel	.51	1-7/8"	1-7/8"	Hvy. Rebar Rust, Serious Delam.
2	2	25' North of Joint #1	25'	"	.33	2-1/8"	2.0"	Light Rust, Concrete Sound
3	7	26' South of Bridge End	15'	"	.44	1-1/4"	1-3/8"	Light Rust, Delaminated Cracked
4	7	25' South of Bridge End	17'	"	.50	1-1/2"	1-1/2"	Heavy Rust, Delaminated

SOUTHWESTERN BLVD. S.H. 9269 (ROUTE 20)
TEST RESULTS (BEFORE OVERLAY)

SPAN & LANE	LONG.LOCATION	TRANSVERSE OFFSET	POTENTIAL (VOLTS)	DEPTH OF COVER (inches)	CHLORIDES (#/c.y.) 1"	2"	3"
Span 4							
W.B.	0+40	2'	-	-	4.4	0.8	0.5
W.B.	0+40	12'	.48	1-7/8"	4.0	1.1	0.6
E.B.	0+40	21'	.38	1-7/8"	10.1	0.3	0
Span 3							
W.B.	0+32.5	2'	-	-	1.8	0.9	0
W.B.	0+32.5	10'	.35	2-3/4"*	5.7	0.9	0
E.B.	0+32.5	20'	.51	2-1/8"*	3.1	0.5	0
Span 2							
W.B.	0+20	2'	-	-	1.5	1.1	0
W.B.	0+20	10'	.48	1-3/4"	5.9	1.1	0.6
E.B.	0+20	20'	.49	2.0"	6.6	1.1	0.4

*Denotes interpolated reading

Table #1. POTENTIAL VALUES

SOUTHWESTERN BLVD. S.H. 9269 (Rte. 20)

	SPAN 1		SPAN 2		SPAN 3	
Survey Dates	* A&B Areas	* C Area	* A&B Areas	* C Area	* A&B Areas	* C Area
Initial Survey 4/6/76	$\bar{x}$ = .31 s = .043 n = 64	= .44 = .052 = 24	$\bar{x}$ = .32 s = .039 n = 45	= .46 = .044 = 25	$\bar{x}$ = .32 s = .050 n = 134	$\bar{x}$ = .45 s = .077 n = 112
After Construction Survey 5/19/77	$\bar{x}$ = .28 s = .072 n = 78	= .35 = .080 = 29	$\bar{x}$ = .29 s = .078 n = 57	= .34 = .064 = 27	$\bar{x}$ = .29 s = .058 n = 162	$\bar{x}$ = .39 s = .069 n = 134

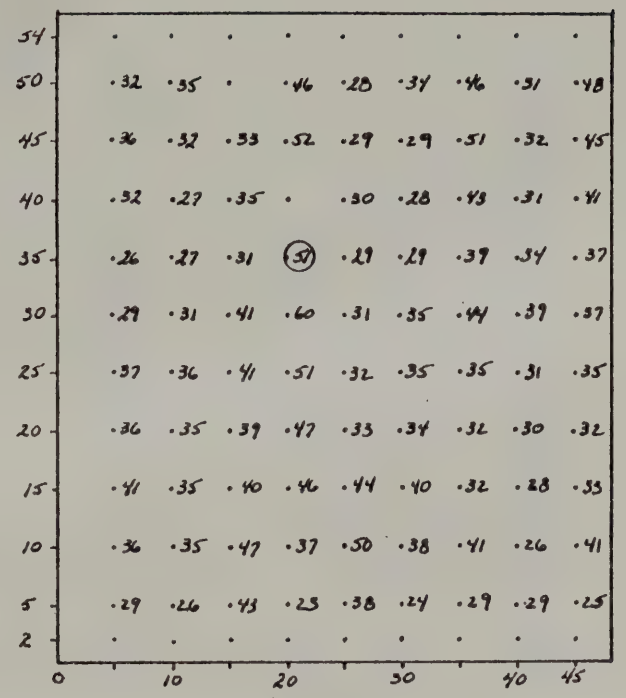
	SPAN 4		SPAN 5		SPAN 6	
Survey Dates	* A&B Areas	* C Area	* A&B Areas	* C Area	* A&B Areas	* C Area
Initial Survey 4/6/76	$\bar{x}$ = .32 s = .049 n = 31	= .42 = .019 = 9	$\bar{x}$ = .31 s = .056 n = 168	= .45 = .054 = 82	$\bar{x}$ = . 30 s = .054 n = 29	$\bar{x}$ = .50 s = .048 n = 21
After Construction Survey 5/19/77	$\bar{x}$ = .26 s = .067 n = 38	= .33 = .057 = 10	$\bar{x}$ = .26 s = .057 n = 200	= .31 = .069 = 99	$\bar{x}$ = .25 s = .062 n = 36	$\bar{x}$ = .38 s = .068 n = 24

	SPAN 7	
Survey Dates	* A&B Areas	* C Area
Initial Survey 4/6/76	$\bar{x}$ = .34 s = .045 n = 10	= .46 = .055 = 60
After Construction Survey 5/19/77	$\bar{x}$ = .24 s = .072 n = 15	= .35 = .078 = 69

*NOTE Class A&B areas are areas of concrete removal where reinforcing steel remains in existing chloride contaminated concrete.

Class C areas are areas where reinforcing bars are enclosed within chloride free, new Latex Modified Concrete.

POTENTIAL DATA TAKEN ON 4/76 (BEFORE OVERLAY)
READINGS IN HUNDREDTHS OF A VOLT



SPAN 1

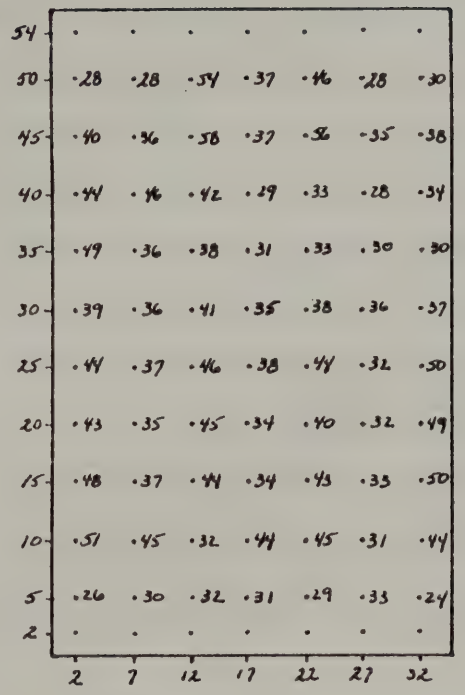
NORTH

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK
RC 66-21 B.I.N. 1015450

○ CALIBRATION CORE LOCATION

□ CHLORIDE LOCATION

POTENTIAL DATA TAKEN ON 4/76 (BEFORE OVERLAY)
READINGS IN HUNDREDTHS OF A VOLT



SPAN 2

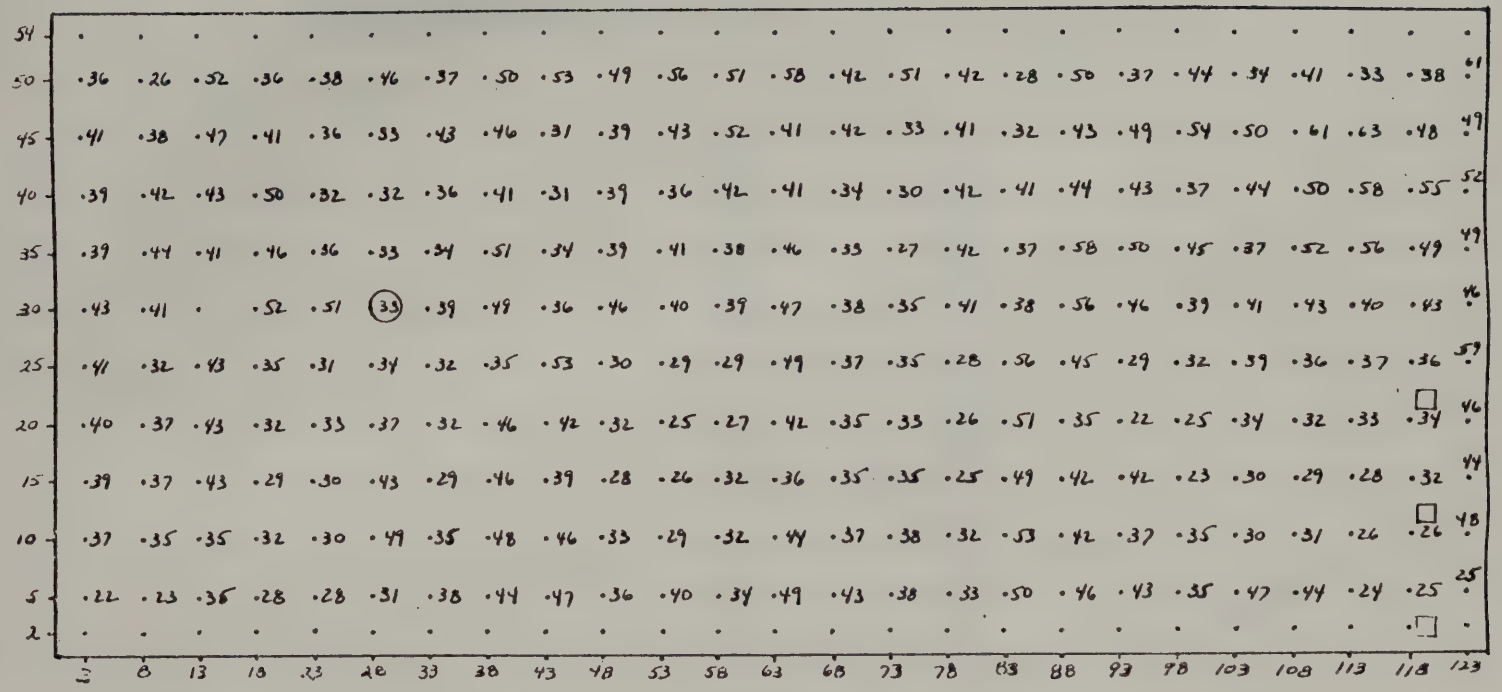
NORTH

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK
RC 66-21 B.I.N. 1015450

○ CALIBRATION CORE LOCATION

□ CHLORIDE LOCATION

POTENTIAL DATA TAKEN ON 4/76 (BEFORE OVERLAY)
READINGS IN HUNDREDTHS OF A VOLT



SPAN 3

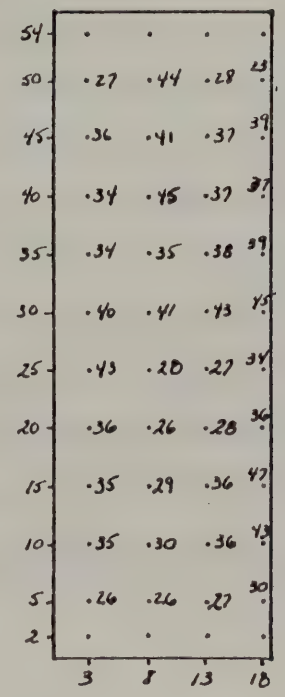
NORTH

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK
RC 66-21 B.I.N. 1015450

○ CALIBRATION CORE LOCATION

□ CHLORIDE LOCATION

POTENTIAL DATA TAKEN ON 4/76 (BEFORE OVERLAY)
READINGS IN HUNDREDTHS OF A VOLT



SPAN 4

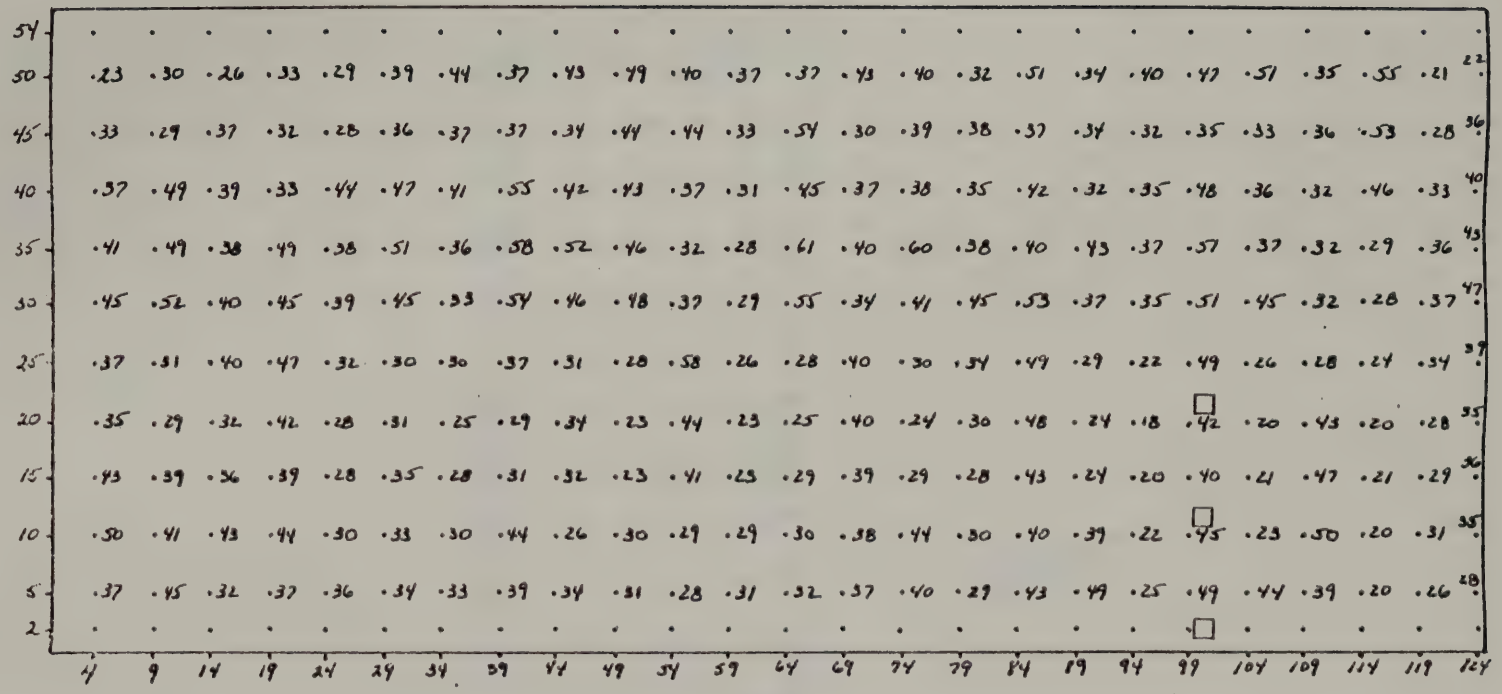
NORTH

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK
RC 66-21 B.I.N. 1015450

○ CALIBRATION CORE LOCATION

□ CHLORIDE LOCATION

POTENTIAL DATA TAKEN ON 4/76 (BEFORE OVERLAY)
READINGS IN HUNDREDTHS OF A VOLT



SPAN 5

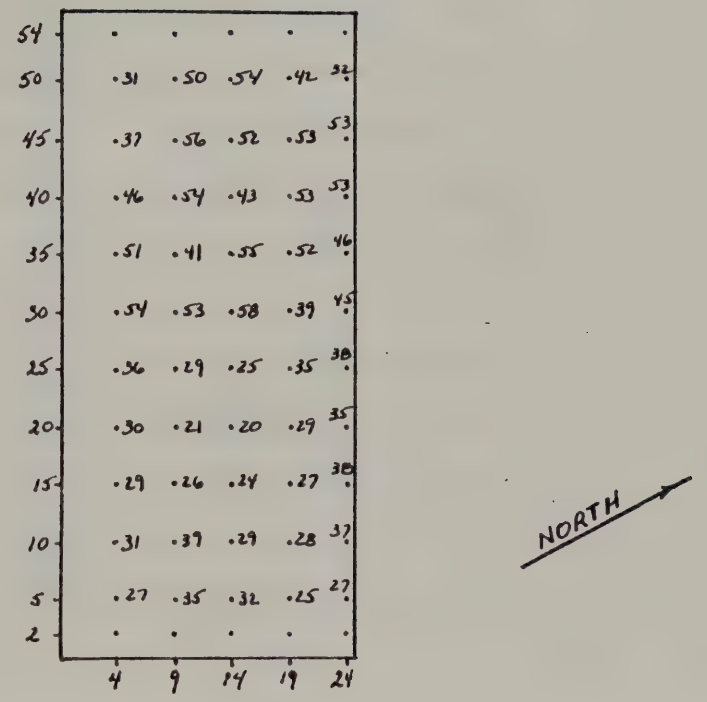
NORTH

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK
RC 66-21 B.I.N. 1015450

○ CALIBRATION CORE LOCATION

□ CHLORIDE LOCATION

POTENTIAL DATA TAKEN ON 4/76 (BEFORE OVERLAY)
READINGS IN HUNDREDTHS OF A VOLT



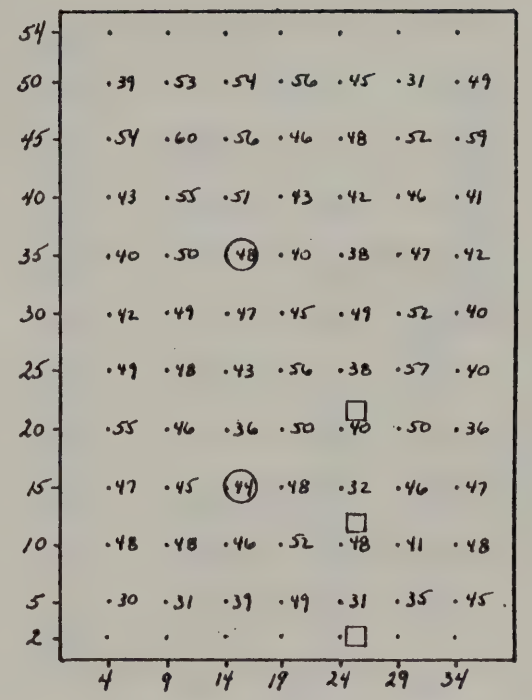
SPAN 6

○ CALIBRATION CORE LOCATION

□ CHLORIDE LOCATION

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK
RC 66-21 B.I.N. 1015450

POTENTIAL DATA TAKEN ON 4/76 (BEFORE OVERLAY)
READINGS IN HUNDREDTHS OF A VOLT



SPAN 7

NORTH

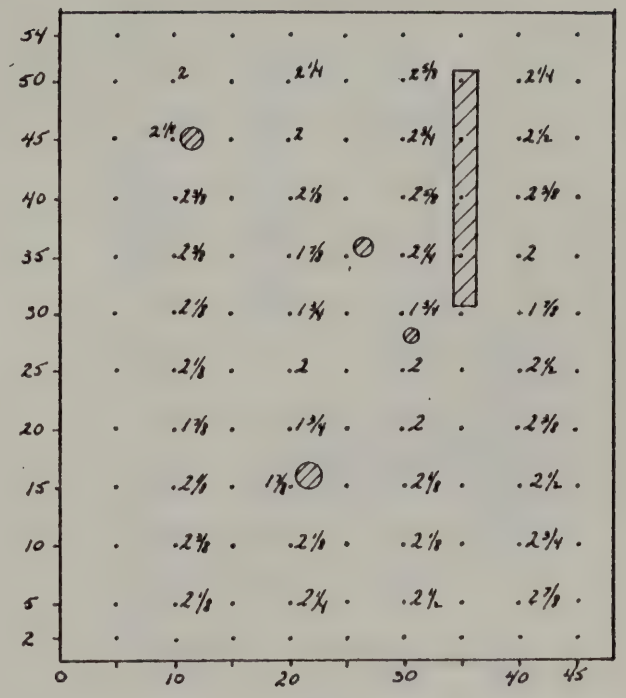
SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK
RC 66-21 B.I.N. 1015450

○ CALIBRATION CORE LOCATION

□ CHLORIDE LOCATION

REINFORCING STEEL COVER (BEFORE OVERLAY)

READINGS IN INCHES



SPAN 1

NORTH

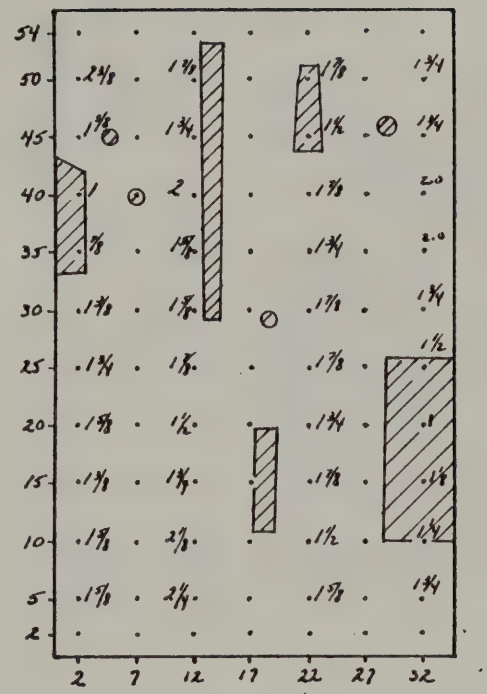
SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

DELAMINATED OR HOLLOW AREA

REINFORCING STEEL COVER (BEFORE OVERLAY)

READINGS IN INCHES



SPAN 2

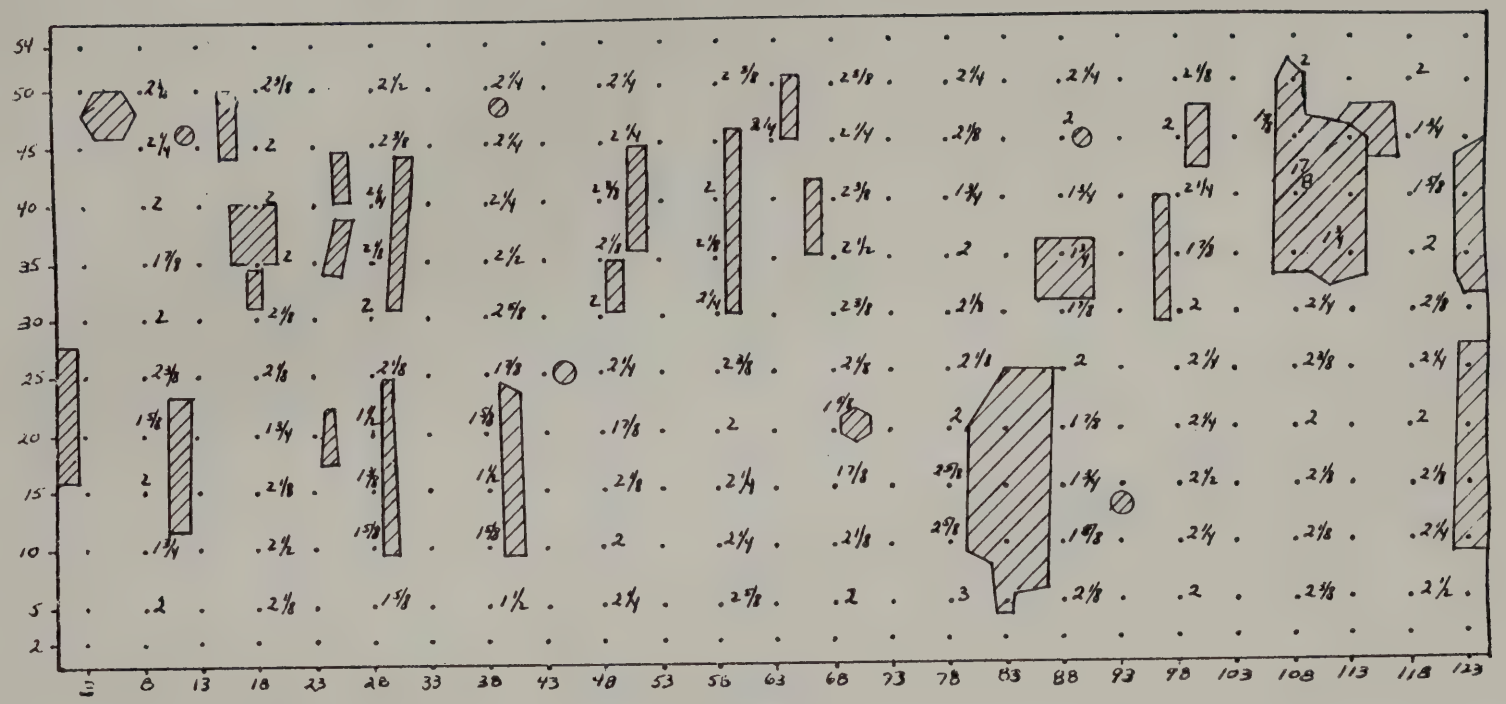
SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

DELAMINATED OR HOLLOW AREA

REINFORCING STEEL COVER (BEFORE OVERLAY)

READINGS IN INCHES



SPAN 3

NORTH

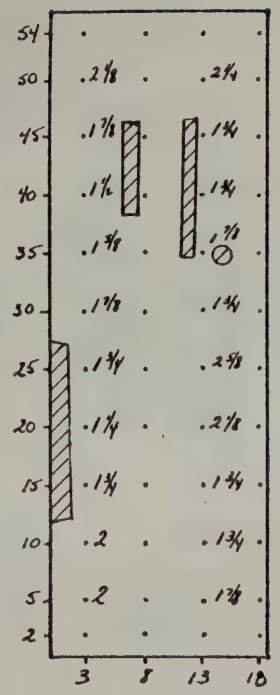
SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

DELAMINATED OR HOLLOW AREA

REINFORCING STEEL COVER (BEFORE OVERLAY)

READINGS IN INCHES



SPAN 4

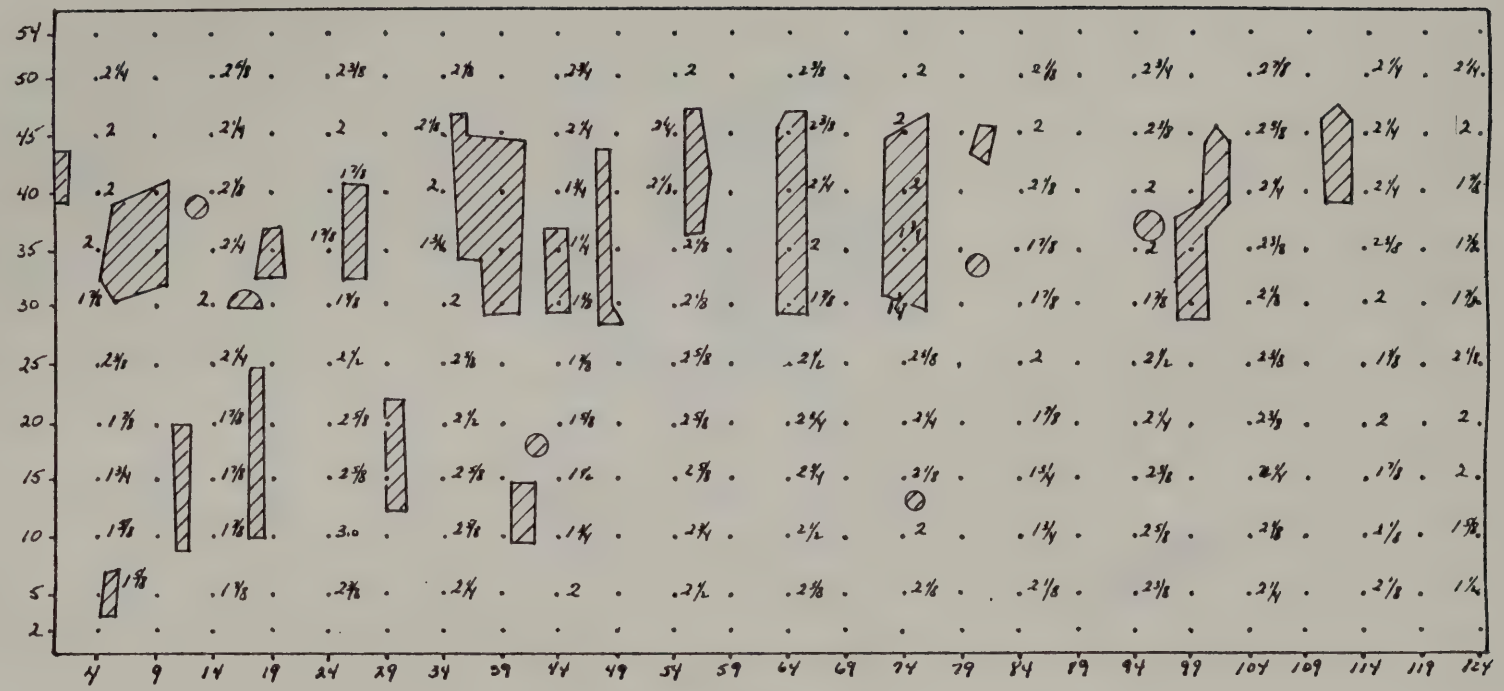
SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

DELAMINATED OR HOLLOW AREA

REINFORCING STEEL COVER (BEFORE OVERLAY)

READINGS IN INCHES



SPAN 5

FT

NORTH

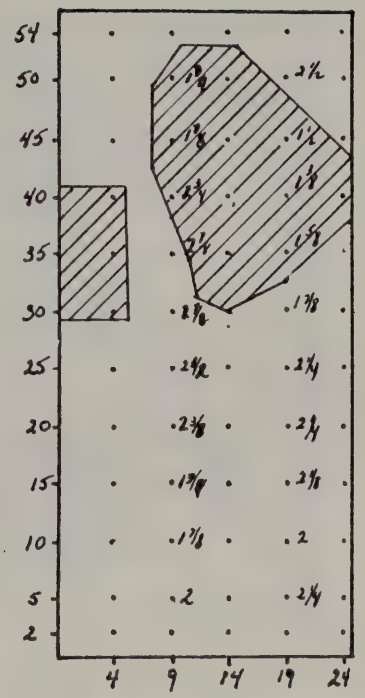
SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

DELAMINATED OR HOLLOW AREA

REINFORCING STEEL COVER (BEFORE OVERLAY)

READINGS IN INCHES



SPAN 6

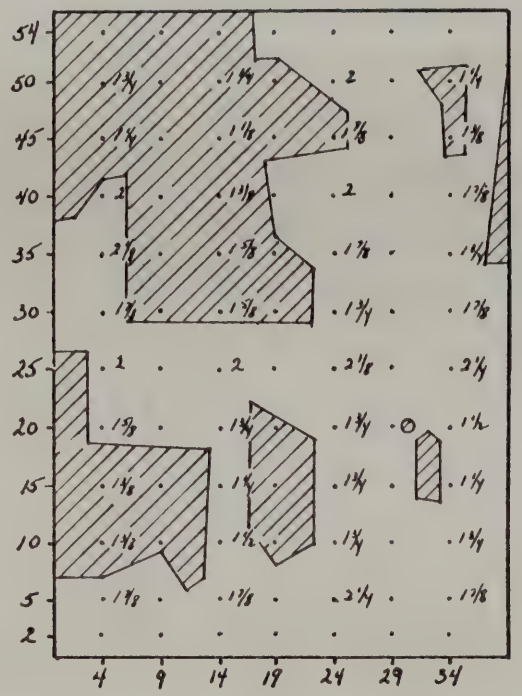
SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

DELAMINATED OR HOLLOW AREA

REINFORCING STEEL COVER (BEFORE OVERLAY)

READINGS IN INCHES



SPAN 7

NORTH

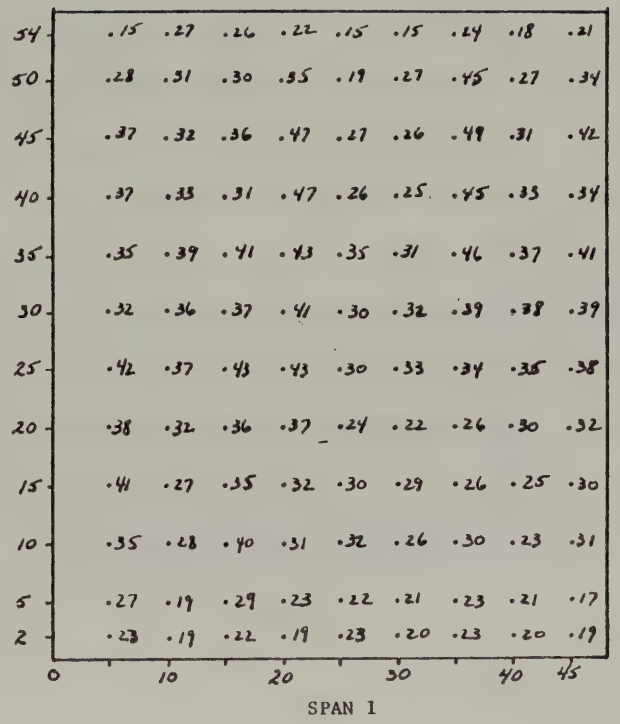
SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

DELAMINATED OR HOLLOW AREA

POTENTIAL DATA TAKEN ON 5/20/77 (AFTER OVERLAY)

READING IN HUNDREDTHS OF A VOLT



SPAN 1

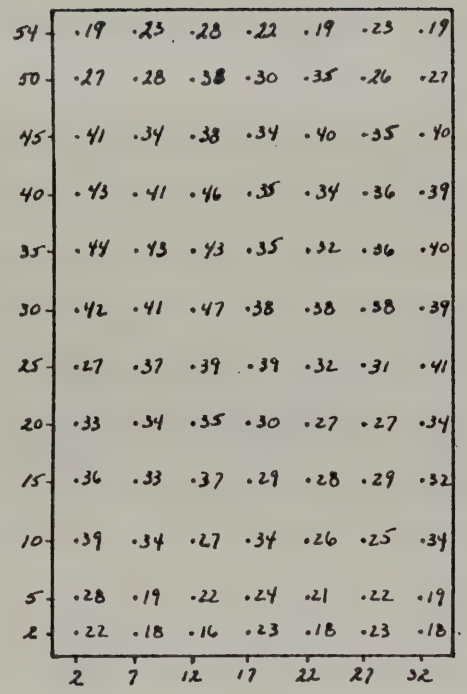
NORTH

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

POTENTIAL DATA TAKEN ON 5/20/77 (AFTER OVERLAY)

READING IN HUNDREDTHS OF A VOLT



SPAN 2

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

POTENTIAL DATA TAKEN ON 5/20/77 (AFTER OVERLAY)

READING IN HUNDREDTHS OF A VOLT

54	.23	.19	.29	.26	.33	.30	.26	.32	.26	.29	.36	.32	.29	.31	.36	.26	.20	.29	.29	.25	.19	.21	.18	.23	22
50	.32	.26	.37	.27	.35	.37	.31	.36	.38	.36	.43	.45	.42	.39	.46	.35	.26	.40	.35	.42	.34	.33	.28	.34	40
45	.43	.36	.40	.37	.35	.32	.37	.43	.32	.37	.42	.41	.40	.37	.34	.36	.34	.41	.44	.52	.42	.45	.41	.40	44
40	.37	.44	.40	.41	.34	.37	.36	.38	.32	.35	.34	.41	.36	.35	.34	.39	.40	.41	.40	.38	.44	.43	.44	.47	48
35	.38	.40	.37	.37	.36	.37	.38	.43	.34	.37	.37	.42	.37	.33	.31	.39	.38	.46	.40	.40	.36	.44	.48	.47	46
30	.37	.36	.36	.38	.42	.36	.38	.46	.35	.47	.35	.40	.42	.35	.34	.38	.37	.43	.38	.37	.39	.37	.37	.41	42
25	.40	.32	.36	.35	.37	.35	.33	.34	.40	.33	.29	.33	.42	.37	.35	.35	.51	.33	.30	.35	.38	.37	.35	.35	45
20	.31	.29	.33	.26	.30	.31	.25	.27	.30	.26	.21	.26	.36	.34	.34	.27	.47	.29	.20	.28	.32	.27	.30	.28	36
15	.30	.27	.29	.26	.23	.28	.21	.29	.29	.24	.24	.31	.36	.29	.32	.21	.36	.32	.21	.28	.29	.24	.23	.26	34
10	.29	.27	.28	.24	.26	.30	.25	.32	.35	.25	.24	.31	.36	.30	.27	.26	.39	.31	.25	.26	.28	.29	.24	.24	35
5	.19	.19	.23	.19	.25	.27	.27	.27	.27	.26	.27	.29	.30	.36	.31	.28	.38	.28	.35	.29	.28	.38	.24	.19	22
2	.22	.20	.18	.17	.23	.27	.26	.25	.25	.26	.25	.26	.31	.30	.28	.28	.25	.26	.34	.48	.28	.25	.27	.18	20
	3	8	13	18	23	28	33	38	43	48	53	58	63	68	73	78	83	88	93	98	103	108	113	118	123

SPAN 3

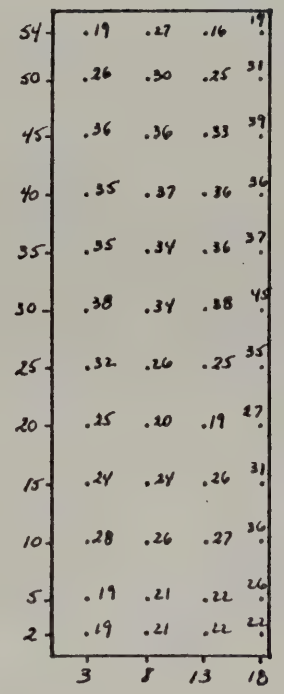
NORTH

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

POTENTIAL DATA TAKEN ON 5/20/77 (AFTER OVERLAY)

READING IN HUNDREDTHS OF A VOLT



SPAN 4

NORTH

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

POTENTIAL DATA TAKEN ON 5/20/77 (AFTER OVERLAY)

READING IN HUNDREDTHS OF A VOLT

	4	9	14	19	24	29	34	39	44	49	54	59	64	69	74	79	84	89	94	99	104	109	114	119	124	
54	.14	.24	.18	.22	.18	.22	.18	.22	.29	.29	.28	.22	.21	.27	.20	.17	.20	.21	.26	.19	.20	.23	.22	.19	15°
50	.23	.28	.22	.39	.24	.31	.28	.28	.32	.32	.31	.27	.31	.38	.32	.26	.25	.27	.37	.29	.27	.30	.31	.24	30°
45	.36	.32	.36	.28	.31	.30	.30	.33	.32	.36	.37	.31	.33	.25	.29	.27	.32	.32	.31	.33	.29	.33	.42	.30	87°
40	.33	.40	.39	.36	.37	.34	.37	.40	.39	.39	.34	.28	.32	.39	.36	.32	.33	.36	.35	.40	.36	.34	.36	.35	47°
35	.38	.38	.38	.35	.33	.32	.31	.49	.36	.34	.33	.26	.37	.30	.36	.31	.33	.35	.30	.32	.33	.29	.30	.35	48°
30	.40	.42	.39	.33	.36	.29	.29	.46	.34	.32	.35	.26	.44	.28	.34	.32	.32	.38	.30	.32	.33	.26	.29	.33	50°
25	.35	.28	.34	.39	.27	.34	.26	.34	.27	.28	.35	.25	.30	.29	.30	.30	.34	.30	.22	.36	.25	.26	.24	.30	34°
20	.23	.23	.26	.27	.19	.21	.19	.24	.21	.20	.27	.17	.23	.23	.19	.23	.29	.20	.18	.28	.22	.25	.21	.26	80°
15	.34	.30	.30	.27	.19	.21	.19	.25	.22	.18	.26	.20	.25	.24	.22	.20	.29	.20	.17	.31	.18	.27	.18	.23	34°
10	.42	.32	.33	.34	.27	.26	.28	.31	.26	.23	.22	.25	.25	.28	.31	.26	.29	.24	.19	.31	.20	.31	.18	.24	29°
5	.29	.29	.26	.27	.27	.28	.24	.27	.25	.27	.21	.24	.24	.24	.33	.22	.33	.27	.19	.26	.20	.32	.16	.19	21°
2	.29	.27	.26	.25	.25	.25	.24	.25	.26	.27	.20	.23	.27	.28	.33	.27	.28	.25	.24	.31	.25	.30	.19	.19	17°

SPAN 5

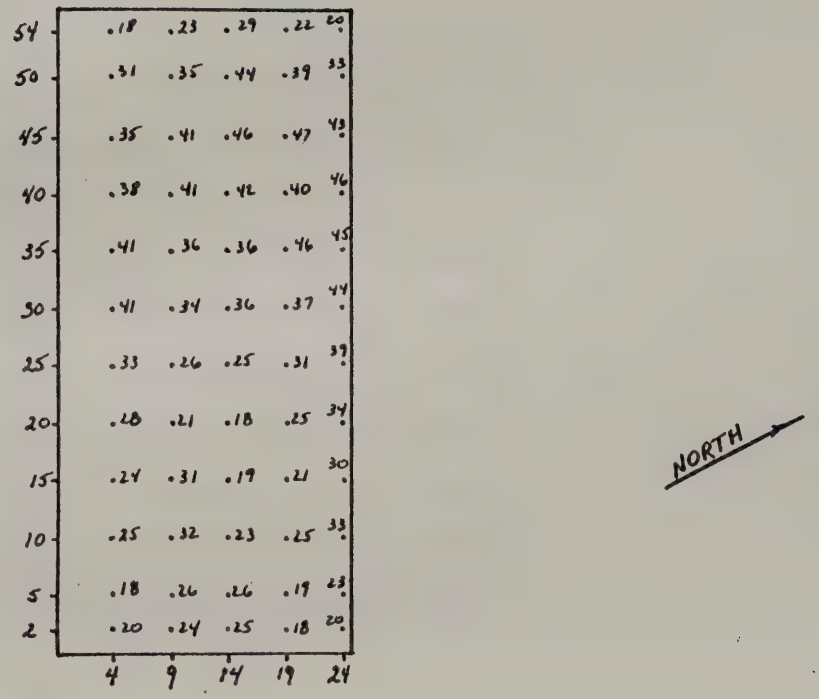
NORTH

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

POTENTIAL DATA TAKEN ON 5/20/77 (AFTER OVERLAY)

READING IN HUNDREDTHS OF A VOLT



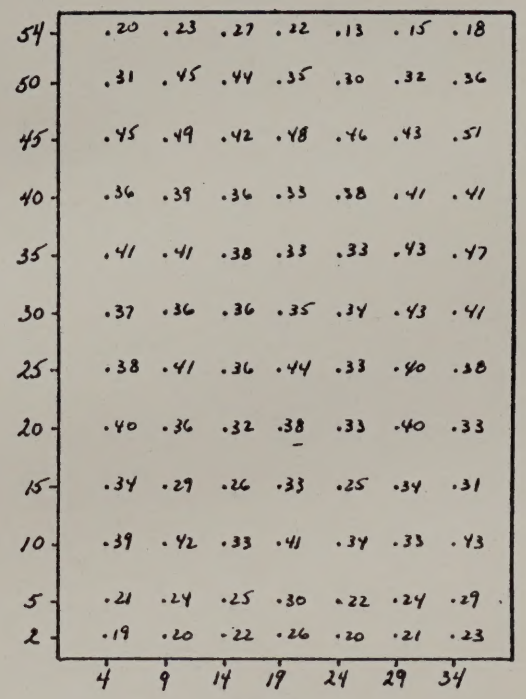
SPAN 6

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450

POTENTIAL DATA TAKEN ON 5/20/77 (AFTER OVERLAY)

READING IN HUNDREDTHS OF A VOLT

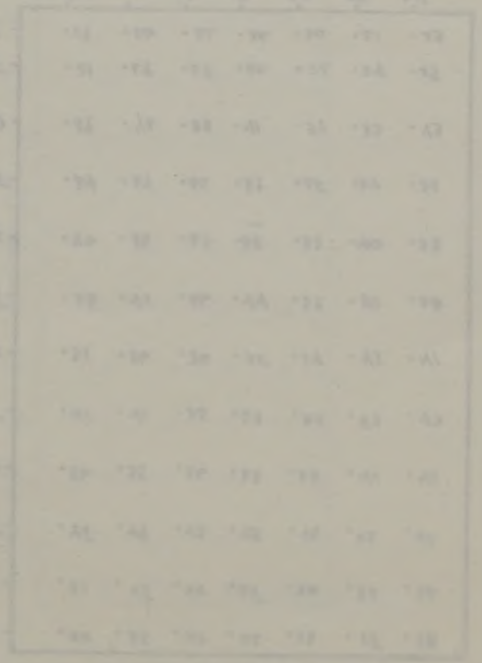


SPAN 7

NORTH

SOUTHWESTERN BLVD. (ROUTE 20) OVER 18 MILE CREEK

RC 66-21 BIN 1015450



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